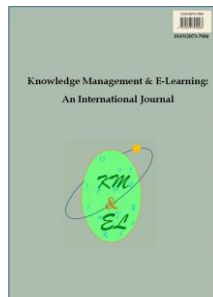

Opportunities for improving how and when Canadians are informed about new prescription medications

**Helen Monkman
Andre W. Kushniruk
Elizabeth M. Borycki
Debra Sheets
Jeff Barnett**

University of Victoria, Victoria, BC, Canada

Hannah Park

University of Kansas, Lawrence, KS, USA



Knowledge Management & E-Learning: An International Journal (KM&EL)
ISSN 2073-7904

Recommended citation:

Monkman, H., Kushniruk, A. W., Borycki, E. M., Sheets, D., Barnett, J., & Park, H. (2020). Opportunities for improving how and when Canadians are informed about new prescription medications. *Knowledge Management & E-Learning*, 12(4), 427–447.
<https://doi.org/10.34105/j.kmel.2020.12.024>

Opportunities for improving how and when Canadians are informed about new prescription medications

Helen Monkman* 

School of Health Information Science
University of Victoria, Victoria, BC, Canada
E-mail: monkman@uvic.ca

Andre W. Kushniruk 

School of Health Information Science
University of Victoria, Victoria, BC, Canada
E-mail: andrek@uvic.ca

Elizabeth M. Borycki 


School of Health Information Science
University of Victoria, Victoria, BC, Canada
E-mail: emb@uvic.ca

Debra Sheets 

School of Nursing
University of Victoria, Victoria, BC, Canada
E-mail: dsheets@uvic.ca

Jeff Barnett 

School of Health Information Science
University of Victoria, Victoria, BC, Canada
E-mail: jebarnet@uvic.ca

Hannah Park 

The Department of Design
School of Architecture & Design
University of Kansas, Lawrence, KS, USA
E-mail: design_park@ku.edu

*Corresponding author

Abstract: The Canadian prescription process requires a person to go through several steps. Prescription medications have associated risks and benefits and it is important for people to be aware of these before and while they are taking medications. One of the approaches to informing people about new prescription

medications is that they are provided Consumer Medication Information (CMI). CMI is given to Canadians at the pharmacy when they pick up prescriptions, they will be taking for the first time. This study used semi-structured interviews to examine the lived experiences of a sample of Canadians ($N = 36$) to identify opportunities for improvement in how and when they are informed about new prescription medications. The findings were synthesized into a journey map. Generally, participants wanted to receive CMI digitally and earlier in the prescription process. Adopting these changes could have several benefits which include loss prevention and increased accessibility to CMI as well as more participatory decision making and opportunities to ask questions. Future research is warranted to explore similar topics with a larger sample and determine what method (e.g., email, website, mobile application) would be most suitable.

Keywords: Consumer medication information; Patient medication information; Prescription drug information leaflets; Patient information leaflets; Written medication information; Journey mapping

Biographical notes: Dr. Helen Monkman is an Assistant Professor in the School of Health Information Science at the University of Victoria. Her mission is to improve consumer health information systems by making them easier for people to use and the information therein easier to understand. Her work seeks to empower people and help them make better health decisions as well as have better conversations with their health care providers. Her research interests include human factors, user experience, usability, eHealth literacy, digital health literacy, information visualization, and how these factors impact the use and understandability of consumer health information systems.

Dr. Andre Kushniruk is Director and Professor of the School of Health Information Science at the University of Victoria. Dr. Kushniruk conducts research in a number of areas including evaluation of the effects of technology, human-computer interaction in health care and other domains as well as cognitive science. His work is known internationally and he has published widely in the area of health informatics. He focuses on developing new methods for the evaluation of information technology and studying human-computer interaction in health care and he has been a key researcher on a number of national and international collaborative projects.

Dr. Elizabeth Borycki is a Professor in the School of Health Information Science at the University of Victoria and is a Clinician Scientist with the Michael Smith Foundation for Health Research in British Columbia Canada. She is the Director of the Global Laboratory for Digital Health Innovation. Elizabeth has published extensively in the field of health informatics and health care. Elizabeth's research foci include health technology safety, human factors (including evidence-based user interface design, usability and workflow) as well as health technology implementation.

Dr. Debra Sheets is a Professor in the School of Nursing, at the University of Victoria (UVic). Her research interests focus on gerontology and geriatric nursing—and in particular dementia and caregiving, technology in home care, and creativity and aging.

Jeff Barnett worked with the British Columbia Cancer Agency (BCCA) for more than 30 years, first as a clinical pharmacist and then as the director of clinical informatics. He retired from BCCA in 2013; however, he remains involved with research in informatics and pharmacy practice. His current focus is on personal health records, data warehousing, privacy, pharmacy systems

and mobile devices. He is an adjunct professor at the University of Victoria and University of British Columbia. He is the Chair of the Clinical Oversight Committee for e-health in the province of B.C.

Hannah Park is an Assistant Professor in the School of Architecture and Design, University of Kansas. Her research interests include the role of design thinking in healthcare, which involves electronic health record, consumer health information, medical education, and mental healthcare. She has facilitated numerous community-engaged design scholarship projects with her students, which were funded by a wide range of organizations, including Frost Bank, Make A Wish Foundation, Audubon National Society, SRVS Disability Support Memphis, and Hill's Pet Nutrition, Colgate-Palmolive. Her research has been presented internationally, including AIGA, CAA, Cumulus, E&PDE, RASC, SXSW EDU, and TEDx.

1. Introduction

Prescription medication (or drug) use is common. Some people may take a single medication for a short duration. Other people may need to take multiple medications for the rest of their lives. From 2007 to 2011, an average of 26% of 15-24 year old's reported taking at least one prescription medication in the past two days (Rotermann, Sanmartin, Henessy, & Arthur, 2014). Unsurprisingly, this proportion increases with age whereby 83% of 65-79 year old's reported regularly taking at least one medication (Rotermann et al., 2014). Similarly, in 2015-2016, 47% of 20-59 year old's and 85% of Americans 60 or older reported using a prescription medication in the past 30 days (Martin, Hales, Gu, & Ogden, 2019). Unsurprisingly, the likelihood of taking prescription medications and polypharmacy (i.e., concurrently taking five or more prescription medications) increases with age (Rotermann et al., 2014; Martin et al., 2019). Specifically, in 2016 approximately 66% of Canadians aged 65 or older were prescribed five or more medications from different drug classes (CIHI, 2016). Moreover, as the number of prescriptions seniors take increases, so too does the risk of being hospitalized due to an adverse drug reaction (CIHI, 2016).

Every medication has its own associated benefits and risks. Given the potential benefits and risks of medication use, it is imperative that people are informed about their medications. This study sought to examine Canadians' experiences with Consumer Medication Information (CMI) in the context of the prescribing process. To this aim, we interviewed participants and had them describe their experiences getting a prescription from start to finish. The focus of this paper is to illustrate the typical process of obtaining a prescription as well as describe opportunities for improving how and when CMI is provided to Canadians based on findings from semi-structured interviews.

Historically, medication information for consumers has been limited to printed text in hardcopy. This is still the predominant practice in Canada. However, consumer health information is becoming increasingly available online and medication information is no exception. Deploying information electronically provides a new set of affordances (e.g., narration, videos, progressive disclosure, tailoring) not feasible for medication information in paper format. This section explores some early research on peoples' attitudes towards digital CMI, CMI currently available for consumers on the Internet, as well a resource that may help inform the design of new types of CMI being developed.

2. Background: Medication information for citizens

Citizens have many different options for accessing information about prescription medications. For example, people can get verbal information from prescribers (i.e., doctors, nurse practitioners). Typically, when prescriptions get filled for the first time in Canada, pharmacists will provide both verbal and printed information called Consumer (or Patient) Medication Information (CMI). CMI is intended to inform consumers about safe and effective use of prescription medications and is provided when the medication is dispensed at the pharmacy (FDA, 2006). CMI is written by pharmacies or other organizations, not the drug manufacturers (FDA, 2006). Notably, CMI is not reviewed by Health Canada, but should align with the product monograph (Government of Canada, 2014). For an international comparison of countries' regulations regarding written medication information (e.g., CMI) see Yuan, Raynor, and Aslani (2019). What is problematic about the lack of standardization is that inconsistencies have been identified between the content provided for different medications from the same pharmacy (Monkman & Kushniruk, 2017a) as well between CMI for the same medication sourced from different pharmacies (Monkman & Kushniruk, 2017b). There are also additional sources of medication information that citizens can use (e.g., patient package inserts, pill bottle stickers, the internet). However, this study will focus on the current limitations and opportunities for CMI with an emphasis on how they are provided to people in terms of the method and timing.

There are some important limitations of CMI and other written medication that are beyond the scope of this study (e.g., content, design). For example, Kimberlin and Winterstein (2008) argued that CMI still suffered from a "lack of critical information about the management of medications, significant redundancy of information resulting in excessively long leaflets, poor formatting, and inadequate legibility and reading level" (p. 29-30). Moreover, CMI is typically strictly text based and does not leverage the potential benefits of multimedia. Pander Maat and Lentz (2010) identified the following four general limitations of CMI as prevalent in their study as well as others:

1. "The leaflet is quite long and its text structure is unclear; some of the obligatory headings are interpreted incorrectly;
2. The visual formatting of the text does not adequately reflect its structure;
3. Important information is 'hidden' in long text sections;
4. The information is often unclear about patient actions" (p. 118)

These limitations were consistent with inspections of Canadian CMI by Monkman and Kushniruk (2017a, 2017b) who described problematic examples of the length of CMI (with important information that was buried, as well as ambiguous information).

CMI content may exceed consumers' levels of health literacy and therefore risk being not understood, misunderstood, as well as readily forgotten. Studies have explored improving the design and content of CMI to make it more usable and understandable (e.g., Boudewyns et al., 2015; Morrow et al., 2005; Park, Jones, Pearsall, & Araojo, 2018). However, modifications to the design and content of CMI are not going to be addressed in this study. Instead, we will focus on how and when CMI is delivered and what opportunities exist to improve these aspects of provision. Monkman and Kushniruk (2015) argued that consumer health information that is strictly text fails to leverage the opportunities of multimedia. Another study revealed that people tend to prefer CMI that includes images (Monkman, Kushniruk, Borycki, Sheets, & Barnett, 2019).

Reported reading rates of CMI and similar written medication materials for citizens are often low. For example, Patel, Bapat, Bhansali, and Sansgiry (2018) found that a minority of participants (11%) report always reading CMI and over a quarter (26%) read CMI often in their sample of university students ($N = 306$; Mean age = 23.6 years old). Further, a large portion of the participants reported rarely (21%) or never (11%) reading CMI (Patel et al., 2018). Reported deterrents to Canadians reading CMI include the documentation itself, its provision (i.e., how and when people obtain CMI), and the context (Monkman et al., 2019). Similarly, Koo, Krass, and Aslani (2003) found that factors affecting CMI use in Australians included the patient, written information document, and the environment.

Despite the importance of CMI, currently it has important shortcomings in terms of *how* and *when* it is provided to people. The first shortcoming of CMI provision relates to its medium: pharmacies give Canadians CMI to people printed on paper. This may result in occasions when CMI is not available when consumers need it. For example, a person experiences what might be a side effect of the medication while they are at work. However, they cannot check to see whether or not their symptom is indeed a side effect, or what course of action they should take. CMI could also be lost or disposed of and therefore unavailable. Hammar, Nilsson, and Hovstadius (2016) also posited that benefits to digital medication information include: 1) ensuring the information is current and 2) increasing usability and flexibility by allowing users to adjust the font, offering audio, and including definitions of terminology. The second shortcoming of CMI provision relates to its timing or *when* it is given to people: pharmacies give Canadians CMI when they pick up their prescriptions. Although people may have received some information about the medication from their prescriber, this review is not typically as comprehensive as the CMI. Therefore, people may have questions about the medication that arise as a result of reading the CMI but would not have either a prescriber or a pharmacist readily available to address their concerns. Additionally, when reviewing the CMI people may find out potential risks about taking the medication that make them feel uncomfortable, after they have paid for the medication. In the United States, the FDA is moving towards an online CMI model (Pearsall et al., 2014). Denmark offers its CMI exclusively through its online resource <https://min.medicin.dk/> and other Nordic countries use similar approaches. For comparison between Canadian and Danish CMI see Monkman, Nøhr, and Kushniruk (2017). This movement towards offering CMI online aligns with the Committee on Safety of Medicines (2005) who asserted “options should be explored for improved access to PILs [Patient Information Leaflets], including availability at or before the prescription or purchase of a medicine, and in other situations where a PIL is not currently available” (p. 5).

Many Canadians seek health information online (Johnson & Johnson, 2016). To overcome the limitations of CMI as it is currently provided, researchers have begun to explore the opportunities of providing CMI digitally. However, we only found one study that examined peoples’ attitudes towards receiving Patient Information Leaflets (PILs, another form of written medication information similar to CMI) electronically instead of the current paper practice. In a sample of 406 Swedes, most (55%) preferred the standard practice of receiving it in the medicating package and only a minority (17%) would have preferred receiving PILs in electronic form (Hammar et al., 2016). Despite most preferring the current paper process, many participants (41%) still responded positively about reading PILs on a computer, phone, or tablet (Hammar et al., 2016). Still, many (32%) were instead hesitant or uncertain about the prospect of digital medication information (Hammar et al., 2016). Unsurprisingly, younger respondents were more receptive to digital PILs than older respondents, and there was no difference between the

genders (Hammar et al., 2016). However, since this study was conducted a few years ago, people may have become more receptive to digital medication information. Moreover, it is likely that the demand for CMI online will only increase and that digital CMI will become at least an alternative to the paper practice, if not a replacement, in the coming years.

Some Canadian pharmacies offer CMI online (e.g., Rexall™, Pharmasave®, Guardian™) are Canadian pharmacy chains that offer CMI on the Internet. The CMI from these three pharmacies is all from a company called MediResource Inc and may differ from what is printed and given to people in person at the pharmacy. However, even Canadian CMI available online is remains predominantly text based and fails to leverage the potential of multimedia. Although online CMI provided by Canadian pharmacies is still primarily text, other websites offer different ways of presenting medication information (e.g., using multimedia). For example, the aforementioned Danish website min.medicin.dk offers instructional slide shows and videos, and images of what the medications look like. Other sites offer tools like pill identification (e.g., <https://www.webmd.com/pill-identification/default.htm>) and quizzes (e.g., <http://use-inhalers.com>). A study compared six websites that offer medication information for citizens and found there were considerable differences amongst sites terms of their length, readability, comprehensiveness, reported side effects and how they were reported, displays, search functionality, and sharing opportunities (Monkman, Schmidt, & Nøhr, 2020). Thus, many websites that offer online medication information still have opportunities to improve how their interfaces and how they convey content to lower the demands on eHealth literacy (Monkman, Kushniruk, Borycki, Sheets, & Barnett, 2020). Despite the increasing amount of CMI available online, it is unclear whether consumers are aware of it, or the extent to which they use these resources.

The focus of this study is to describe participants' previous experiences with CMI as well as their opinions on opportunities for alternatives to current practice for CMI provision. Specifically, we examined *how* participants want to receive CMI and *when* they want to receive it. We analyzed participants opinions and rationale to support their opinions for each of the aforementioned aspects of CMI provision and used these findings to create a journey map depicting both the existing CMI process and possible alternatives.

3. Methods

This study sought to explore how and when Canadians are informed about prescription medications during the prescribing process, with a primary focus on Consumer Medication Information. We conducted this investigation into peoples' experiences with prescription medications and accompanying information as a component of a more comprehensive study exploring citizens' information needs, preferences, and memory for multimedia CMI (Monkman, 2018). The Human Research and Ethical Review Board at the University of Victoria approved this study. We recruited participants for this study by emailing students on the School of Health Information Science listserv and putting up posters across campus. Thirty-eight adults participated in this study and each was remunerated with \$20 CAD gift card. However, two participants were excluded as outliers due to age and therefore the highest participant number as an identifier is 38.

The lead investigator [HM] used semi-structured interviews to explore participants' experiences with prescription medication, opinions on the experience and

information they received, as well as when and how they would like to receive the information. Specific questions posed to participants included:

1. Think of a recent time you got a prescription for a new medication from your doctor.
 - a. Please step through the process starting from getting the prescription and going to the pharmacy.
 - b. How was the medication information presented to you?
 - c. Was the information you received useful and understandable?
 - d. Did you have any problems using or understanding the medication information?
 - e. What did you like or dislike about the process?
 - f. What did you like or dislike about the information?
2. Would you like to receive medication information digitally (e.g., by email, online)?
 - a. Why or why not?
3. When would you like to receive medication information about a new prescription: With your doctor when it is prescribed? When you drop off the prescription and are waiting for it to be filled? Right after you get your new prescription?
 - a. Why do you think this time is best?

Interviews were transcribed in full. We analyzed this qualitative data using a combination of directed and conventional content analysis (Hsieh & Shannon, 2005) and coded the transcripts using MAXQDA™. Directed content analysis is a deductive approach using a predetermined set of codes and is best applied when previous research can be leveraged to explain the current results (Hsieh & Shannon, 2005). Combining it with conventional content analysis provided the flexibility to identify emergent themes to describe findings that were not previously discussed in the literature (Hsieh & Shannon, 2005). Next, a co-author [HP] designed a journey map of the Canadian prescription process that synthesized the findings. A journey map is an illustrated sequence of steps required for a person to achieve a goal (Gibbons, 2018). Journey maps are often used to “see how customer experiences meet customers’ expectations and find areas where they need to improve designs” (Interaction Design Foundation, n.d.). Thus, in this study, the journey map was used to illustrate how Canadians currently get their new prescriptions filled including how they are informed about their new medications with CMI and opportunities of providing CMI differently to better align with their needs and expectations.

4. Results

4.1. Participant characteristics

Participants were generally younger ($M = 23.6$ years old, $SD = 3.8$), predominantly female (72.2%), Caucasian (63.9%), working class (83.3%), spoke English as their first

language (86.1%), and were very comfortable using computers (83.3%). Nearly half (47.2%) of the participants reported reading on a daily basis. Everyone in the sample was a student whereby most (83.3%) were enrolled in full time studies in a variety of faculties, with the most common being Science (25%), Social Sciences (22.2%) and Human and Social Development (19.4%). Precisely half of the were pursuing undergraduate degrees, as indicated by their highest level of completed being high school (50%). Physicians were the most common resources that participants used for medication information (75%) followed by pharmacists (44.4%) and electronic resources (44.4%) and finally family members (25%). The two most common responses for daily prescription medication taking behaviour were: 1) none (44.4%), and 2) one prescription medication (36.1%). Many participants (47.2%) also reported that they followed prescription medication instructions completely. For more details regarding the descriptive statistics of the sample, please see Monkman (2018). The following sections explore participant opinions potential ways CMI could be distributed with respect to medium, method, and timing.

4.2. Previous experiences receiving, using, and storing CMI

This section explores participants' reports regarding their previous experiences with CMI. Whether participants received CMI, whether they used it, and whether they kept it were investigated.

There were several interesting findings regarding when and how participants received CMI and whether or not they kept it. With respect to receiving CMI, two surprising findings emerged. Common Canadian practice is that CMI is given to consumers with new prescriptions (i.e., filled for the first time). However, eight participants (22.2%) did not remember CMI accompanying their most recent new prescription. However, it is possible that these participants merely forgot receiving CMI, as this study asked them to recall their experience which may have been some time ago. Although it is not considered common practice, some participants described having received CMI from their prescribing physicians. Specifically, three participants (8.3%) reported receiving CMI from their physicians. Contrary to common practice, it appears that a) not all participants received CMI when new prescriptions were filled, and b) some participants received CMI from their prescribers instead of or in addition to at the pharmacy.

Another theme identified was whether or not participants actually used CMI. The extent to which participants reported reading CMI they had received varied. Ten participants (27.8%) reported that they typically read CMI they receive with new prescriptions. However, 10 participants (27.8%) described skimming CMI, but not thoroughly reading the information in depth. Further, it could be cause for concern that 12 participants (33.0%) admitted to not reading the CMI whatsoever. Thus, participants had different practices of reading CMI. Specifically, some participants read CMI, others skimmed it, and some participants did not read it.

Storage, or whether participants kept CMI, was also investigated in this sample of health consumers. Interestingly, 20 participants (55.6%) reported keeping CMI either temporarily or indefinitely. However, 10 participants (27.8%) reported recycling CMI almost immediately and five participants (13.9%) reported losing their CMI.

In summary, how and when participants received CMI, as well as the extent to which they used and stored CMI varied. According to participant reports, CMI distribution processes are not consistent. That is, in addition to common practice of providing consumer CMI with new prescriptions at the pharmacy, CMI may be given out

by prescribers, or not given out at all. Additionally, some participants read CMI in its entirety and others just skimmed it. A third of participants reported not reading CMI whatsoever. Further, participants had different CMI storage practices. Some participants kept CMI and others disposed of it almost immediately. Thus, participants reported that they obtained and stored CMI differently. The following sections explore participant reports regarding provision of CMI more in depth by exploring *how* and *when* participants would like to receive CMI and associated advantages of these alternatives.

4.3. How Canadians want to receive CMI: Medium of CMI provision

We asked participants to discuss what medium (i.e., paper or digital) would be best for distributing CMI. Many participants described advantages of more than one medium of provision, as indexed by the sum of participants in Fig. 1 exceeding the total sample (n = 36). However, most participants described advantages of digital distribution of CMI, followed by offering both paper and digital options, some participants described advantages of the paper CMI (i.e., current practice) and one participant was undecided (see Fig. 1). The undecided participant was disregarded from this analysis. For examples of quotes illustrating the themes of advantages of different methods of CMI provision, please see Table 1.

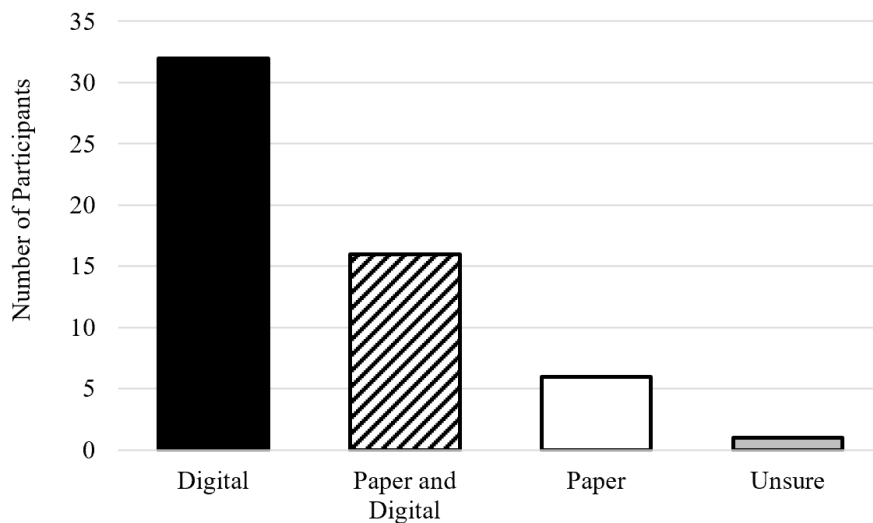


Fig. 1. Frequency of participant reports of advantages for digital and paper provision

Note. Total number of participants exceeds the sample because they could report advantages in more than one CMI medium category. However, participants were only counted once per category regardless of how many advantages they reported.

4.3.1. Advantages of digital CMI provision

The most popular choice was to provide citizens CMI digitally. Thirty-two participants (88.9%) described advantages of digitally distributing CMI (see Fig. 1). Participants generated the following potential benefits of providing CMI digitally:

- Facilitating follow up care by offering digital communication with health care providers

- Facilitating adherence by providing digital reminders
- More environmentally friendly, by reducing paper
- Increased accessibility, loss prevention
- Reputable, trustworthy, and current information
- Supplementary information from additional resources (e.g., links to empirical evidence, reviews from people who have used it)

Table 1

Summary of illustrating quotes describing advantages of different methods of CMI provision in different themes

Method of CMI Provision	Theme of Potential Advantage (description)	Illustrating Quotes
Digital	Facilitates Follow up Care (<i>makes it easier to ask a health care provider questions if they arise after the person starts taking the medication</i>)	Participant 7: "If they were able to somehow create some sort of app or email, if I knew that I was able to respond to that email and be like, 'I'm having this reaction. Should I go to the doctor?' Or, 'Is this normal?' Or have some easier access to the information that I know that I can trust as opposed to going into a pharmacy or having to go back to a walk-in clinic."
Digital	Facilitates Adherence (<i>makes it easier to take medications as prescribed</i>)	Participant 10: "If it had links to a calendar system [laughter] then it could definitely provide people with alerts and notifications and therefore provide a lot of...self-directions and support to properly dose yourself."
Both Digital and Printed	Increases Availability (<i>makes it possible to use the CMI from more locations and makes it more difficult to lose</i>)	Participant 8: "It might be nice to have that [a digital version] in addition to a paper copy, just in case, like I said, you would misplace the [paper copy] – but I also find that reading things on screens sometimes is harder. I don't know. Sometimes I just skim things more."
Both Digital and Printed	Increases Citizens' Preferences (<i>allows people to choose which method they prefer</i>)	Participant 35: "Well, I know some people are more receptive to digital information. There are different type of learners and whatnot. Because definitely, my grandma would not want it this way because she doesn't own a computer, right? So I think the option would be good."
Printed	Increases Convenience (<i>the CMI is given directly to the person</i>) Increases Emphasis (<i>conveys that the CMI is important</i>)	Participant 6: "I'd probably read it just because it's there. So I'm like, 'I should read this because they've given it to me, so obviously it's important.'"

The most common suggestion was that the mechanism for digital CMI distribution could serve as a support tool and facilitate communication between citizens and health care providers. Generally, the onus is on participants for following up about medications. However, participants argued that that a digital messaging system to support

medication use would make them feel more supported in this process. For example, a digital medium could include a communication tool to allow citizens to access to health care providers with follow up questions and concerns (e.g., experiencing side effects) after they started taking a medication.

Participants also generated several other potential benefits of digital provision of CMI. First, a digital medium could potentially improve adherence through digital reminders, specific instructions, and calendar integration. Second, given participants' complaints about the environmental impact of CMI, it is unsurprising that one of the benefits cited was that digital CMI distribution would be more environmentally friendly. Third, participants also recognized the benefits of digital CMI provision in terms of increased accessibility of digital provision and loss prevention. Fourth, participants described the benefits of having digital CMI that not only originated from a reputable and trustworthy source but was also kept current. Finally, participants also discussed the opportunity for providing additional information not typically included in CMI that some consumers may also want to know such as including links to empirical evidence of the medication efficacy as well as having reviews from other people who have used it.

4.3.2. Advantages of offering both digital and printed CMI

Sixteen participants (44.4%) described advantages of giving citizens the option of receiving CMI digitally, on paper, or both. The two reasons participants gave as benefits of having both options available were:

- Increased accessibility
- Increased alignment with citizens' preferences

In terms of increased accessibility, having a digital copy of the CMI in the event the paper was lost or inaccessible (e.g., while away from home) would be beneficial. One participant likened the proposed process to what currently happens with receipts whereby you can choose whether to have one printed or sent to your email. Participants discussed how having a digital version to supplement a printed hardcopy would be convenient in different situations. Although digital offers increased accessibility, one participant noted that digital CMI may be helpful as a backup, but that she tends to read materials more thoroughly in hardcopy. Providing both digital and printed options would increase the flexibility and alignment with how citizens want to receive CMI. Participants discussed how options may be suitable for different age demographics or user preferences. Thus, participants described how letting citizens have the choice between receiving CMI digitally and/or in printed hardcopy would satisfy different citizen needs and preferences as well as be a valuable and convenient backup.

4.3.3. Advantages of printed CMI (current practice)

In contrast to providing CMI digitally either as the sole provision medium or in conjunction with printed CMI, six participants (16.7%) reported advantages to the current practice of providing CMI as traditional paper hardcopies. Two of those six participants argued that providing CMI on paper may compel consumers to read it. Additionally, one participant noted that providing CMI as a hardcopy emphasized its importance.

4.4. When Canadians want to receive CMI: Timing

Participants also described advantages and disadvantages of receiving CMI at different times during the prescription process (e.g., with the prescriber, when the prescription is dropped off, when the prescription is picked up).

Currently, CMI is given to Canadians after their new prescriptions have been filled and they are picking them up. However, there are other opportunities earlier in the prescription process (e.g., when the prescription is written, when the prescription is dropped off at the pharmacy) that may be more effectively to provide this information, in terms of timing. Indeed, the results suggest many participants would prefer receiving CMI earlier in the prescription process than the current practice (see Fig. 2). For examples of quotes illustrating the themes of advantages of different times of CMI provision, please see Table 2.

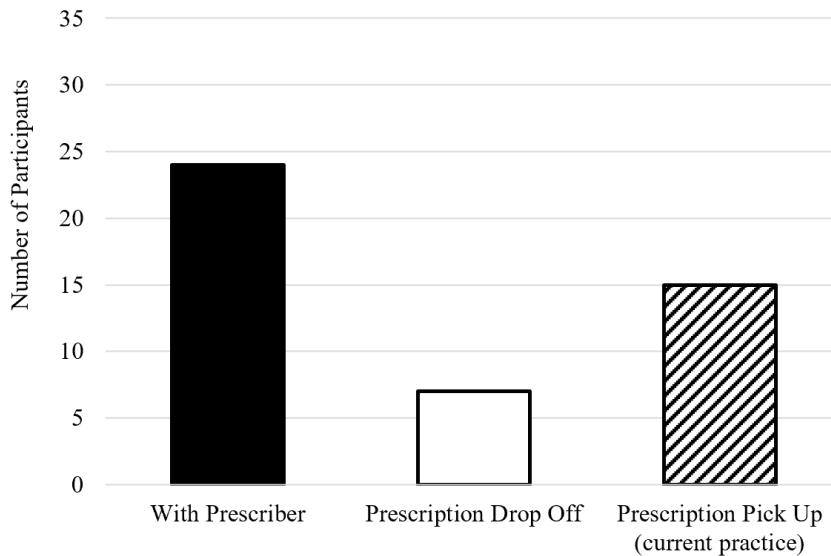


Fig. 2. Frequency of participant reports of advantages for different times of CMI provision

Note: Total number of participants exceeds the sample because they could report advantages in more than one CMI timing category. However, participants were only counted once per category regardless of how many advantages they reported.

Table 2
Summary of quotes illustrating the themes of advantages of providing CMI at different times

Time of CMI Provision	Theme of Potential Advantage	Illustrating Quotes
With Prescriber	Participatory decision-making	Participant 10: “I believe the best time is as early as possible. So, when you're talking to the doctor, he should be able to provide you with options if possible, and then you can understand this prescription before even accepting it. As soon as you accept it there's kind of this inherent assumption where they assume you're going to be taking it if you've filled the prescription. However, if you're receiving this information after you've filled it and then decide you're not comfortable with it, then
	Cost of prescription	

		you have this weird kind of backwards conflict to have either corrections made or if there's money involved, then there's definitely more issues of finances.”
With Prescriber	Participatory decision-making	Participant 13: “I would like mine with my doctor, before I even go and get it... Because if you don't know when you're filling it, what your medication is going to entail, then that may be something that you wish you had known, so that you can say, ‘Oh but wait, I see something that isn't going to work for me,’ or, ‘I have a question about how I'm going to tailor this to myself.’ And I think that deciding with your doctor, whether you even want to fill that prescription is a lot better, because sometimes, they just kind of prescribe you something and then send you on your way. And you're like, ‘I didn't get the chance to tell you that there's no way I'm going to take a medication like that.’ And now I'm left without an option. So, I think it should be right then and there.”
With Prescriber	Trust in their prescriber	Participant 9: “I trust more doctors because she knows my condition and what's happening. So, when she gave the prescription and at the same time told me, what should I do. What should I not do. I feel more comfortable”.
With Prescriber	Different roles of prescribers and pharmacists	Participant 37: “people go to the doctor for advice when it comes to medication. And they go to the pharmacy to pick up their drugs. So, they're not looking for the information when they go to the pharmacy”.
With Prescriber	Prepare questions for pharmacist	Participant 32: “because then if I had any questions, I could ask the pharmacist when I'm getting the medication”.
Prescription drop off	Prepare questions for pharmacist	Participant 1: “I think at the time you drop off your prescription, then you should get the paper. That way, while you're waiting to pick up your prescription, when they fill it out, then you have that time to read it and go over any part that you might not understand. Then you know what questions to ask your pharmacist when you're ready, and when he's ready.”
Prescription drop off	Less overwhelming	Participant 38: “I think as you drop off the prescription. I think when people receive it, it might get a little overwhelmed of trying to remind themselves what they need to do with it. So maybe if you give them the information just prior, like minutes or hours, but within close timing of when they receive the actual medication. But if you do it when they're with their doctor, it might be too far in advance for them to remember that.”
Prescription pick up (current practice)	Complement verbal information from prescribers	Participant 14: “I feel like the, your physician should have, sort of have the duty of saying what it's going to be used for, how often you should take it, but at that point, you haven't fully got it”.
Prescription pick up (current practice)	Facilitate comprehensibility	Participant 11: “at the pharmacy, when I pick up the drugs, so I can be reassured and confident in how I'm going to take it, and then that's it.”
Prescription pick up (current practice)	Reiteration to facilitate memory	Participant 30: “I feel like I want information with the physician and, as well, again, when I pick up the information. So, if I, in between, had forgotten anything it would be covered again. Just people can tend to forget things in between.”
Prescription pick up (current practice)	Facilitate storing CMI with medication	Participant 20: “If I get it with the medication, I usually keep it together wherever I keep it in the drawer or something. So, it kind of goes always in the same side spot. Whereas if I get it from the-- well, I usually fill it the same day, so it's not too much of a problem if I get it from the doctor as well.”

4.4.1. *Advantages of receiving CMI with the provider*

The majority of participants described advantages for providing CMI before they pick up their prescription, contrary to current practice. Specifically, 24 (66.7%) participants argued that the best time to receive CMI would be when consumers are with their prescribers (e.g., physicians, nurse practitioners) and new prescriptions are being written. Reasons participants wanted to receive CMI while they were with their prescribers included:

- Participatory decision-making
- Trust in their prescriber
- Cost of prescription
- Different roles of prescribers and pharmacists
- Prepare questions for pharmacist

The most common reason, cited by 14 (38.9%) participants, for wanting to receive CMI while with the prescriber was to have a participatory decision-making process (i.e., more informed choice about the prescription, opportunity to decide amongst alternatives). Other reasons this timing would be beneficial included that they trust their prescribers most about prescriptions and that they perceive the role of the pharmacy and pharmacist as the dispensing role more than information role. Participants also suggested that receiving CMI earlier would allow them to review the material and questions for the pharmacist. However, not all participants were in favour of receiving CMI earlier because they reported it may deter them from getting the prescription filled or they may be overwhelmed.

4.4.2. *Advantages of receiving CMI when the prescription is dropped off at the pharmacy*

The least popular time identified by participants for providing CMI to consumers was when prescriptions were dropped off at the pharmacy. Specifically, seven participants (19.4%) identified advantages to receiving CMI when a prescription is at the pharmacy for filling. Reported advantages of receiving CMI when the prescription is dropped off included:

- Prepare questions for pharmacist
- Less overwhelming

4.4.3. *Advantages of receiving CMI when the prescription is picked up at the pharmacy (current practice)*

Although most participants wanted CMI earlier, many participants believed that current distributing practice was suitable in terms of timing. That is, fifteen participants (41.7%) reported advantages of receiving CMI when picking up their new prescriptions. These advantages included:

- Complement verbal information from prescribers
- Facilitate comprehensibility
- Reiteration to facilitate memory

- Facilitate storing CMI with medication

In addition to one of the three aforementioned times, some participants felt that CMI should be distributed by both prescribers and pharmacists. For example, participant 30 said:

“I feel like I want information with the physician and, as well, again, when I pick up the information. So, if I, in between, had forgotten anything it would be covered again. Just people can tend to forget things in between.”

4.5. A journey map of the typical Canadian prescription process: Potential problems and opportunities for improvement

This journey map (see Fig. 3) synthesizes the results from the semi-structured interviews. Fig. 3 depicts the typical series of steps required for a Canadian to get a prescription as well as what information is provided to people and what potential problems may arise during these steps and their corresponding opportunities for improvement.

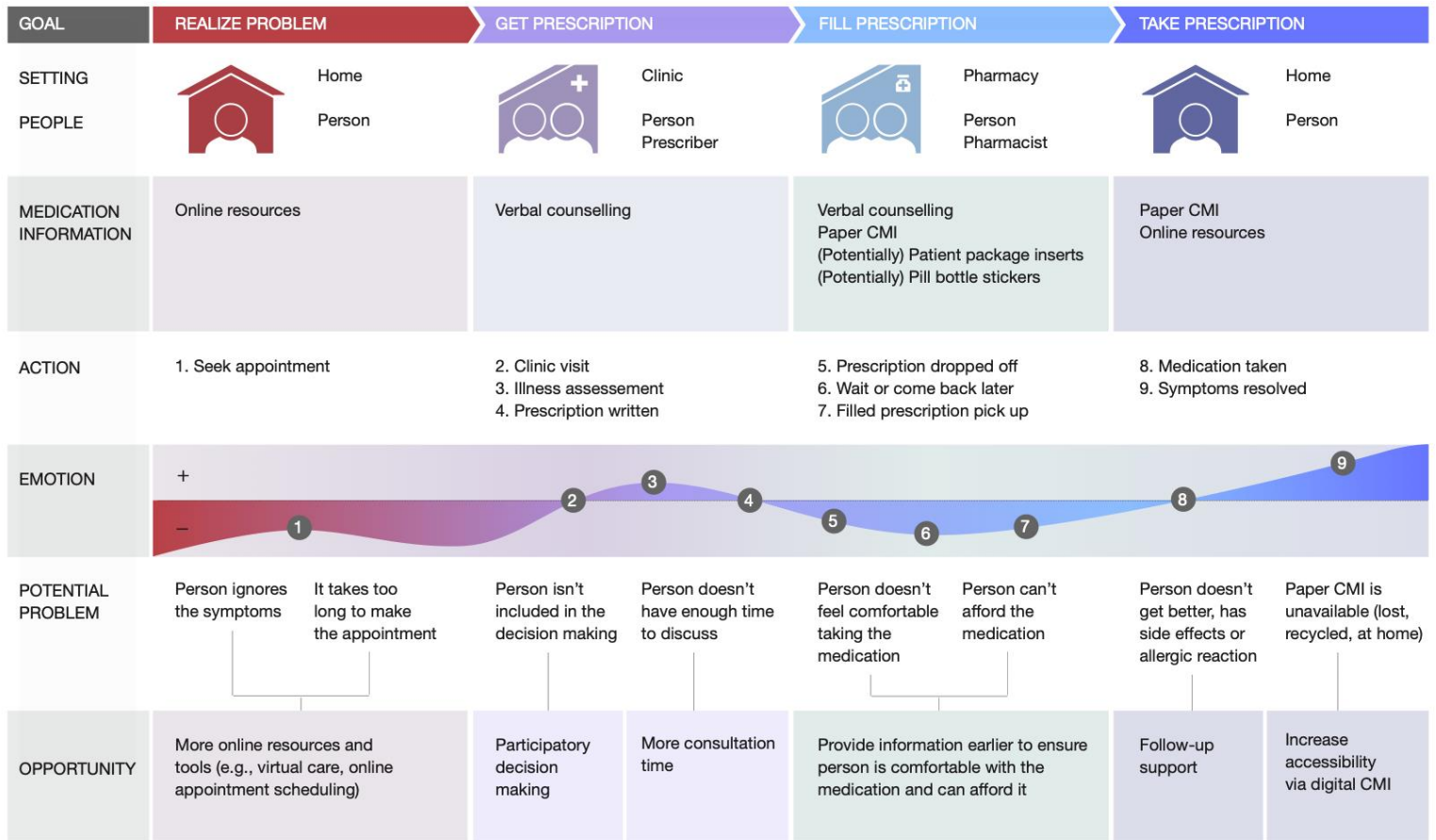


Fig. 3. Journey map of the typical Canadian prescription process

5. Discussion

5.1. What are Canadians' experiences with CMI?

This study explored whether people remembered receiving CMI and from whom, as well as whether they reported using and keeping it. Additionally, participants discussed reasons they were deterred from using CMI as well as opportunities to improve it. Findings from this study suggest that consumers' receipt of CMI is varied. Corresponding with common practice, most participants noted that they had received CMI with their new prescriptions. Interestingly, some participants reported receiving CMI from their prescribers rather than pharmacists. It is concerning that some participants claimed that they had not received CMI with their new prescriptions. However, Gibbs et al. (1989) found that 11- 40% of participants who had received CMI in their study, did not remember having received it. Thus, it would appear that whether CMI is dispensed and by whom are inconsistent, but due to the retrospective self-report nature of this study, it is difficult to determine distribution numbers with any certainty.

Based on participants in this study, it seems that consumers have three approaches to using CMI: read CMI thoroughly, skim it or read only specific sections, and do not read it whatsoever. Our participants were relatively equally divided amongst these three types of CMI use. These findings are similar to some other reports of CMI use (e.g., Nathan et al., 2007; Raynor & Knapp, 2000).

Participants in this study also varied as to whether or not they kept CMI and if they kept it for how long. Just over half of the participants in this study reported keeping CMI. More than one in four participants in this study recycled CMI almost immediately and more than one in ten reported losing their CMI. These present findings align with Koo and colleagues (2005) who found that after reading the CMI, the majority of participants (58%) kept CMI with their medications until the course of medication was complete and participants (21%) disposed of the CMI (Koo et al., 2005). The remaining participants (21%) either kept the CMI for future reference, shared it with a friend who was also prescribed the medication, or did both (Koo et al., 2005). Participants in earlier studies appeared to more likely to keep CMI. For example, 66.7%-82.4% (Gibbs et al., 1989) and 74% (Raynor & Knapp, 2000). Thus, participants may be less likely than they found that participants reported keeping CMI. Thus, it appears that there may be a reduction in the likelihood of keeping CMI over time, this could potentially be due to a variety of factors (e.g., CMI being more common practice and less novel, increased use of the internet).

5.2. How should CMI be provided to Canadians?

Perhaps the transition from paper to electronic CMI is an inevitability, given that most other paper documentation has transitioned or is transitioning to electronic transmission. For example, Pearsall et al. (2014) discussed the FDA's planned move towards a single online repository for medication information for consumers. Similarly, Health Canada (Government of Canada, 2014) offers a database of Product Monographs (<https://health-products.canada.ca/dpd-bdpp/index-eng.jsp>) and asserts that "by providing a central location for authorized Product Monographs, Canadians can rely on free, unbiased, accurate information concerning the drugs they are taking". However, this database is incomplete (i.e., not all prescription medications have Product Monographs available). Further, this database appears to target health professionals more than citizens. For example, Product Monographs are typically lengthy because they also include detailed

information for health professionals as well as scientific information, and information for citizens is at the end of these documents (Government of Canada, 2014). Additionally, the primary ways suggested to query a Product Monographs are by using its Drug Identification Number (DIN), Anatomical Therapeutic Chemical (ATC) code, company, or other characteristics (one of which is product name) (Government of Canada, 2012). Moreover, it is unclear to what extent Canadians are aware of this database, use it, or what their opinions of it are. Although this database is well intentioned, it requires substantial redesign and updating to be a comprehensive tool appropriate for citizen use, especially those with limited eHealth literacy.

Studies around consumers' opinions about this transition are limited and generally indicate a low level of receptiveness (i.e., Hammar et al., 2016). However, results from this study support Hammar and colleagues' (2016) findings with respect to their younger participants who were more receptive to receiving medication information digitally. Specifically, nearly nine out of ten participants in this study were interested in receiving CMI electronically for themselves. However, participants also argued for the continuation of paper CMI distribution as an option for those consumers who prefer it in hardcopy. Thus, the participants in this study were open to receiving CMI electronically, but more as an additional option rather than a replacement to the current paper-based practice.

In contrast to previous reports that only a minority of consumers were interested in digital CMI (Hammar et al., 2016), participants in this study were very interested in digital CMI. This may have been attributable to their younger age and the notion that digital CMI was not necessarily a replacement for paper, but instead it would be an optional medium for receiving it.

5.3. When should CMI be provided to Canadians?

Participants recognized potential benefits of having access to CMI earlier in the prescriptions process, as it would allow them to make a more active participant in the prescription process and facilitate more informed choice about whether or not to actually fill the prescription. This finding suggests that consumers want the opportunity to consider options and to have conversations about medications, rather than the traditional paternalistic process of passively receiving and filling a prescription. This finding is supported by the Committee on Safety of Medicines (2005), who urged the exploration of providing consumers CMI earlier in the prescription process and the need to improve CMI provision more generally. Koo, Krass, and Aslani (2002) reports of consumers in their focus groups resonated with the findings from this study:

“Many consumers preferred to receive a CMI together with their medication to prevent losing the CMI. However, the majority preferred to receive the CMI prior to paying or taking the medication and a few preferred to receive a CMI from the doctor. Some consumers commented that CMIs could be wasted if given when they were feeling physically unwell or emotionally upset.” (p. 112)

This theme of offering more CMI provision timing options is consistent with international agencies and research. The United States is moving towards a single online source of medication information for consumers which will allow physicians, pharmacists, and consumers access to the same CMI and will provide consumers with CMI earlier in the prescription process (Pearsall et al., 2014). Wali et al. (2016) also echoed the benefits of having medication information available when participants needed it for consumers with limited health literacy.

5.4. Limitations

There were several limitations to this study. First, it only examined the Canadian perspective and participants were drawn from a single province. Although there are likely similarities amongst prescription processes in other provinces and countries, differences may exist as well. For example, many countries use ePrescribing (e.g., United States, Estonia) rather than written prescriptions and offer their CMI online (e.g., Denmark). Further, the opinions of this sample may not be generalizable because of its size and the demographics (i.e., younger, well-educated). Further, this study only examined whether people were receptive to receiving medication information digitally and not the specific methods (e.g., email, online, mobile application) that they could use to access it.

5.5. Future research

There are numerous opportunities for future research on topics from this study and other related to them. Future research could explore opinions of people with other demographics (e.g., older, lower eHealth literacy). Additionally, examining international perspectives of how and when CMI is provided is warranted. Moreover, specific methods for providing digital CMI should be explored in order to align its provision with peoples' preferences and increase the likelihood of its use.

6. Conclusion

There are a number of opportunities for improving the current Canadian prescription process and how people are informed about new prescription medications. Some of these opportunities relate to process changes (e.g., ePrescribing, allowing for more time with prescribers, easier to access or automatic follow up care). However, changes could be made to way we inform people about their prescriptions (e.g., offer CMI digitally instead of on paper) and when this occurs (i.e., earlier in the prescription process). Many people want to be active participants in their health care and informing them about the risks and benefits of a new prescription medication earlier would facilitate an increased role in decision-making. Providing CMI digitally, at least as a complementary option to paper CMI, would both serve as a mechanism of loss prevention and increased availability. Additionally, digital CMI could be incorporated into more comprehensive tools to facilitate adherence (e.g., medication reminders). Providing CMI earlier in the prescription process would allow Canadians to prepare questions for their prescribers and/or pharmacists. Another issue how prescription medication information is given to Canadians is that currently prescription costs are only made available at the point of sale, near the end of the prescription process. In cases where prescriptions are unaffordable, there are significant time inefficiencies for the people, prescribers, and pharmacists involved. Moreover, the person then has to decide what to do either start the process all over and hope there is a less expensive alternative or be cost nonadherent. Cost nonadherence is when people "do anything to make their prescription last longer, not fill a new prescription or not renew a prescription" (Law, Cheng, Dhalla, Heard, & Morgan, 2012, p. 298). An estimated 5.5% of Canadians reported affordability barriers that prevented them from purchasing a prescribed medication in the past year and prescriptions for mental health were the most likely not to be filled due to cost (Law et al., 2018). Further, an average of 10% of Canadian reported skipping prescriptions or doses due to associated prescription costs and these rates were even higher for people with chronic conditions (Sarnak, Squires, & Kuzmak, 2017). Reading rates for CMI are generally low (e.g., Patel et al., 2018) this study's findings were consistent with that.

However, it is possible that reading rates could be improved by making modifications to the timing and medium that CMI is given to people. Overall, there are several reasons that motivate informing Canadians about new prescription medications earlier, digitally, and including at least estimates of associated costs.

Author Statement

The authors declare that they have no conflict of interest.

ORCID

Helen Monkman  <https://orcid.org/0000-0003-0772-9075>

Andre W. Kushniruk  <https://orcid.org/0000-0002-2557-9288>

Elizabeth M. Borycki  <https://orcid.org/0000-0003-0928-8867>

Debra Sheets  <https://orcid.org/0000-0002-6467-0682>

Jeff Barnett  <https://orcid.org/0000-0001-7660-2225>

Hannah Park  <https://orcid.org/0000-0002-6811-4245>

References

- Boudewyns, V., O'Donoghue, A. C., Kelly, B., West, S. L., Oguntimein, O., Bann, C. M., & McCormack, L. A. (2015). Influence of patient medication information format on comprehension and application of medication information: A randomized, controlled experiment. *Patient Education and Counselling*, 98(12), 1592–1599. doi: 10.1016/j.pec.2015.07.003
- Canadian Institute for Health Information (CIHI). (2016). *Drug use among seniors in Canada, 2016*. Retrieved from <https://www.cihi.ca/sites/default/files/document/drug-use-among-seniors-2016-en-web.pdf>
- Committee on Safety of Medicines. (2005). *Always read the leaflet: Getting the best information with every medicine*. Medicines and Healthcare Products Regulatory Agency and Committee on Safety of Medicines. London, UK: The Stationary Office. Retrieved from [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/391090/Always Read the Leaflet getting the best information with every medicine.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/391090/Always_Read_the_Leaflet_getting_the_best_information_with_every_medicine.pdf)
- FDA (U.S. Food and Drug Administration). (2006). *Guidance: Useful written consumer medication information (CMI)*. Retrieved from <https://www.fda.gov/media/72574/download>
- Gibbons, S. (2018, December 9). *Journey Mapping 101*. Nielsen Norman Group. Retrieved from <https://www.nngroup.com/articles/journey-mapping-101/>
- Gibbs, S., Waters, W. E., & George, C. F. (1989). The benefits of prescription information leaflets (1). *British Journal of Clinical Pharmacology*, 27(6), 723–739.
- Government of Canada. (2012, April 25). *Drug product database online query*. Health Canada. Retrieved from <https://health-products.canada.ca/dpd-bdpp/index-eng.jsp>
- Government of Canada. (2014, July 11). *Frequently asked questions: Product monographs posted to the health Canada Website*. Health Canada. Retrieved from

<https://www.canada.ca/en/health-canada/services/drugs-health-products/drug-products/applications-submissions/guidance-documents/product-monograph/frequently-asked-questions-product-monographs-posted-health-canada-website.html>

- Hammar, T., Nilsson, A.-L., & Hovstadius, B. (2016). Patients' views on electronic patient information leaflets. *Pharmacy Practice*, 14(2), 702. doi: 10.18549/PharmPract.2016.02.702
- Hsieh, H.-F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 1277–1288.
- Interaction Design Foundation. (n.d.). *Customer journey maps*. Retrieved from <https://www.interaction-design.org/literature/topics/customer-journey-map>
- Johnson, E., & Johnson C, S. (2016). Internet use and access to health information among Canadians: Are the elderly on the sidelines? *Journal of Gerontology & Geriatric Research*, 5(6). doi: 10.4172/2167-7182.1000367
- Kimberlin, C. L., & Winterstein, A. G. (2008). *Expert and consumer evaluation of consumer medication information – 2008: Final report*. The U.S. Department of Health and Human Services and The Food and Drug Administration. Retrieved from <https://ntrl.ntis.gov/NTRL/dashboard/searchResults/titleDetail/PB2009105293.xhtml>
- Koo, M., Krass, I., & Aslani, P. (2002). Consumer opinions on medicines information and factors affecting its use — An Australian experience. *International Journal of Pharmacy Practice*, 10(2), 107–114. doi: 10.1111/j.2042-7174.2002.tb00595.x
- Koo, M. M., Krass, I., & Aslani, P. (2003). Factors influencing consumer use of written drug information. *Annals of Pharmacotherapy*, 37(2), 259–267.
- Koo, M. M. M., Krass, I., & Aslani, P. (2005). Consumer use of consumer medicine information. *Journal of Pharmacy Practice and Research*, 35(2), 94–98. doi:10.1002/j.2055-2335.2005.tb00314.x
- Law, M. R., Cheng, L., Dhalla, I. A., Heard, D., & Morgan, S. G. (2012). The effect of cost on adherence to prescription medications in Canada. *CMAJ: Canadian Medical Association Journal*, 184(3), 297–302.
- Law, M. R., Cheng, L., Kolhatkar, A., Goldsmith, L. J., Morgan, S. G., Holbrook, A. M., & Dhalla, I. A. (2018). The consequences of patient charges for prescription drugs in Canada: A cross-sectional survey. *CMAJ Open*, 6(1), E63–E70.
- Martin, C. B., Hales, C. M., Gu, Q., & Ogden, C. L. (2019). *Prescription drug use in the United States, 2015–2016*. NCHS Data Brief (No. 334). Retrieved from <https://www.cdc.gov/nchs/data/databriefs/db334-h.pdf>
- Monkman, H. (2018). *Consumer medication information: Memory, perceptions, preferences, and information needs*. Doctoral dissertation. University of Victoria, Victoria, British Columbia, Canada. Retrieved from <https://dspace.library.uvic.ca/handle/1828/10431>
- Monkman, H., & Kushniruk, A. W. (2015). Optimizing the efficacy of multimedia consumer health information. *Studies in Health Technology and Informatics*, 208, 286–290.
- Monkman, H., & Kushniruk, A. W. (2017a). All consumer medication information is not created equal: Implications for medication safety. *Studies in Health Technology and Informatics*, 234, 233–237.
- Monkman, H., & Kushniruk, A. W. (2017b). Consumer medication information: Similarities and differences between three Canadian pharmacies. *Studies in Health Technology and Informatics*, 234, 238–242.
- Monkman, H., Kushniruk, A. W., Barnett, J., Borycki, E. M., & Sheets, D. (2019). We built it, but they are not coming: Exploring deterrents to consumer medication information use. *Studies in Health Technology and Informatics*, 265, 189–194. doi:

10.3233/SHTI190162

- Monkman, H., Kushniruk, A. W., Borycki, E. M., Sheets, D., & Barnett, J. (2020). Differences in memory, perceptions, and preferences of multimedia consumer medication information: Experimental performance and self-report study. *JMIR Human Factors*, 7(4): e15913.
- Monkman, H., Nøhr, C., & Kushniruk, A. W. (2017). A comparison of Danish and Canadian consumer medication information. *Studies in Health Technology and Informatics*, 241, 147–152.
- Monkman, H., Schmidt, T., & Nøhr, C. (2020). Online medication information for citizens: A comparison of demands on ehealth literacy. *Studies in Health Technology and Informatics*, 270, 1026–1030.
- Morrow, D. G., Weiner, M., Young, J., Steinley, D., Deer, M., & Murray, M. D. (2005). Improving medication knowledge among older adults with heart failure: A patient-centered approach to instruction design. *The Gerontologist*, 45(4), 545–552. doi: 10.1093/geront/45.4.545
- Nathan, J. P., Zerilli, T., Cicero, L. A., & Rosenberg, J. M. (2007). Patients' use and perception of medication information leaflets. *The Annals of Pharmacotherapy*, 41(5), 777–782.
- Pander Maat, H., & Lentz, L. (2010). Improving the usability of patient information leaflets. *Patient Education and Counseling*, 80(1), 113–119.
- Park, L. M., Jones, P. R., Pearsall, B. M., & Araujo, R. T. (2018). An update on medication guides. *Pharmacoepidemiology & Drug Safety*, 27(2), 129–132. doi: 10.1002/pds.4370
- Patel, H. K., Bapat, S. S., Bhansali, A. H., & Sansgiry, S. S. (2018). Development of prescription drug information leaflets: Impact of cognitive effort and patient involvement on prescription medication information processing. *Therapeutic Innovation & Regulatory Science*, 52(1), 118–129. doi: 10.1177/2168479017716714
- Pearsall, B. M., Araujo, R., & Hinton, D. (2014). Essential medication information for patients: Ensuring access. *Therapeutic Innovation & Regulatory Science*, 48(2), 162–164.
- Raynor, D. K., & Knapp, P. (2000). Do patients see, read and retain the new mandatory medicines information leaflets? *Pharmaceutical Journal*, 264, 268–270.
- Rotermann, M., Sanmartin, C., Hennessy, D., & Arthur, M. (2014). Prescription medication use by Canadians aged 6 to 79. *Health Reports*, 25(6), 3–9.
- Sarnak, D. O., Squires, D., & Kuzmak G. (2017). *Paying for prescription drugs around the world: Why is the U.S. an outlier?* The Commonwealth Fund. Retrieved from https://heatinformatics.com/sites/default/files/images-videos/FileContent/media_files_publications_issue_brief_2017_oct_sarnak_payin_g_for_rx_ib_v2.pdf
- Wali, H., Hudani, Z., Wali, S., Mercer, K., & Grindrod, K. (2016). A systematic review of interventions to improve medication information for low health literate populations. *Research in Social and Administrative Pharmacy*, 12(6), 830–864. doi: 10.1016/j.sapharm.2015.12.001
- Yuan, H.-C. T., Raynor, D. K., & Aslani, P. (2019). Comparison of international regulations for written medicine information (WMI) on prescription medicines. *Therapeutic Innovation & Regulatory Science*, 53(2), 215–226.